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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,497	02/28/2002	Geun-Young Yeom	YPL-0027	2173

7590 04/27/2004  
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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT PAPER NUMBER

1763

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 10/086,497	Applicant(s) YEOM ET AL.	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-7,17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-7,17 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 7, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005, Hamamura et al., U.S. Patent 5,342,448 and Motley et al., U.S. Patent 4,662,977.

Kadomura shows the invention substantially as claimed including an apparatus using a neutral beam, the apparatus comprising: a reaction chamber 20 having a stage 24 therein on which a substrate 7 is mounted; a neutral beam generator 21 for

generating an argon neutral beam from a source gas to supply the neutral beam to the reaction chamber; an etching gas supply of diatomic chlorine for supplying an etching gas into the reaction chamber; and a purge gas supply for supplying a purge gas into the reaction chamber (see fig. 3 and col. 5-line 62 to col. 7-line 5).

Kadomura fails to expressly disclose a shutter disposed between the neutral beam generator and the reaction chamber, for controlling the supply of the neutral beam into the reaction chamber. Minton et al. discloses a shutter 20 disposed between the neutral beam generator and the reaction chamber, for controlling the supply of the neutral beam into the reaction chamber (see fig. 1 and col. 4-line 45 to col. 6-line 56). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura to include the shutter of Minton et al. because this allows for the screening out of unwanted products.

Kadomura and Minton et al. do not expressly disclose a controller for controlling the supply of the source gas, the etching gas, and the purge gas, and the opening and closing of the shutter. Hamamura et al. discloses the utilization of a controller 38 to control a gas controller 36 and shutter controller 37 (see figs. 1, 11A and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al. so as to include the controller of Hamamura et al. because this would allow for greater controllability over the processes performed within the apparatus.

Kadomura, Minton et al., and Hamamura et al. do not expressly disclose the claimed plate-shape tiltable reflector which is positioned in a path of the accelerated ion beam for reflecting and neutralizing the ion beam, and wherein the reflector is one of a semiconductor substrate, a silicon dioxide, and a metal substrate. Motley et al. discloses the use of a plate-shape metal tiltable reflector positioned in the path of the beam for reflecting and neutralizing the beam (see, for example, fig. 1 and its description). Therefore, in view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al. and Hamamura et al. so as to comprise a plate-shape metal tiltable reflector in order reflect and neutralize the ion beam.

Regarding the specific claimed tiltable range of 75-85 degrees of the reflector and the substrate being silicon, it should be noted that such limitations are directed to a method limitations instead of an apparatus limitations and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses that do not further limit, and therefore, do not patentably distinguish the claimed invention. The apparatus of Kadomura modified by Minton et al., Hamamura et al., and Montley et al. is capable of processing a silicon substrate and tilting the reflector in the claimed range.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005,

Hamamura et al., U.S. Patent 5,342,448 and Motley et al., U.S. Patent 4,662,977, as applied to claims 1, 5, 7, and 17-18 above, and further in view of Chen et al., U.S. Patent 6,331,701 or Löb, U.S. Patent 5,036,252.

Kadomura, Minton et al., Hamamura et al., and Montley et al. are applied as above but fail to expressly disclose that the ion source for the neutral beam is one of high density helicon plasma ion gun and an ICP-type ion gun. Chen et al. disclose an apparatus comprising a neutral beam source wherein the ion source is either a high density helicon plasma ion gun or an ICP-type ion gun (col. 3, lines 35-48). Also, Löb discloses an apparatus comprising an ion source having an ICP-type ion gun (fig. 1 and its description). Therefore, in view of these disclosures it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al., Hamamura et al., and Montley et al., as to comprise one of a helicon plasma ion gun and an ICP-type ion gun as the ion source, as taught by Chen et al. or Löb, because such ion sources are a suitable alternative to generate a source of particles for the neutral beam.

### ***Response to Arguments***

Applicant's arguments with respect to claim 1, 5-7, and 17-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro  
Primary Examiner  
Art Unit 1763

April 23, 2004